AMATEUR SATELLITE REPORT

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AMSAT® NA *Newsletter for the Amateur Radio Space Program*

Amateur Satellite Report is endorsed by the American Radio Relay League as the special interest Newsletter serving the Amateur Radio Satellite Community

Lack Of Congressional Support Threatens U.S. Space Station

NASA announced the award of initial contracts for the U.S. Space Station earlier this month. Major contractors will be McDonnell Douglas Astronautics, Boeing, Rocketdyne Division of Rockwell and General Electric. However, even before letter contracts were issued to the awardees, NASA was attempting to stave off expected 60 to 70% cuts in the Station's Fiscal 1988 budget of $767 million being forced by Congress. Space Station Director Andrew Stofan said he would recommend cancellation of the program to NASA head James Fletcher before he allows Station budget instability to replicate the 50 formal budget replanning exercises undertaken in the 1970's Shuttle development program.

Surrey Issues Status Reports On Three Satellites

UO-9 will execute a two-week operational schedule of Telemetry/Bulletin/WOD and Status Messages. The 21 MHz beacon will be on while the 2.4 GHz beacon will be off.

UO-11 has been returned to normal operations following problems experienced with the new FORTH DIARY On Board Computer software loaded for the first time last month. Diagnostics have not shown up any software faults and so memory "worm" tests will be scheduled in the new year to assess whether there is a "bad" portion of the 32 kbyte memory which is normally used for WOD but which FORTH DIARY was using for its own purposes.

Work on UoSAT-C is progressing apace at Surrey targeted at a launch in late 1988. The mission, objectives, payloads and other relevant information will be detailed in future bulletins from Surrey.

There is an opportunity for an experienced RF engineer to work at Surrey alongside the UoSAT Team on UO-C. Anyone interested should contact:

Dr. Martin Sweeting
UoSAT Spacecraft Engineering Research Unit
University of Surrey
Guildford, Surrey GU2 5XH UK

Short Bursts

- Morton Thiokol successfully test fired a re-designed Shuttle booster engine in Utah the week of December 21. The success helps clear the way for a June 1988 resumption of Shuttle launches.
- Leo Labutin, UA3CR, and his colleagues in the joint Russian/Canadian Skitrek Expedition returned home to the Soviet Union Christmas Day after their most recent training and familiarization tour in Canada. The Skitrek is now due to depart on the three month cross-polar trek on or about March 1.
- American Rocket Company, AMROC, is back in business. The pioneering California commercial launch concern suffered what some saw as a fatal loss of financing as a result of the stock market crash. But now it has rebounded and is back in business sources indicate. AMSAT NA has been offered a free ride on the first launch scheduled for late 1989 or early 1990. The launch appears suitable for a low earth orbit mission such as a PACSAT.

AO-10 Ops Schedule

Here is the AO-10 operating schedule for the next two months:

AMSAT OSCAR 10 Transponder Operating Schedule
Revised 26Dec87

Time Frame	Mode B Operating Times in MA
Jan 04 thru Jan 17	0 thru 159 and 221 thru 255
Jan 18 thru Jan 31	0 thru 169 and 231 thru 255
Feb 01 thru Feb 14	0 thru 179 and 241 thru 255
Feb 15 thru Feb 28	0 thru 189

At the end of February, the sun angle will again go below 50% requiring suspension of operations for a couple of months.

The current (late December) attitude of AO-10 has been estimated by G3RUH to be approximately 112 and -10 degrees in the Bahn coordinate system. In computer pro-

grams requiring this input, enter 112 for Bahn Longitude and -10 for Bahn Latitude. Some programs do not require this input.

As always, please insure you use the lowest uplink power levels so as to insure satellite health as well as good communications.

TRANSPOLAR SKITREK/PROJECT NORDSKI COMM FACT SHEET

WHAT: A skiing expedition from northernmost Russia to northernmost Canada via the North Pole.

WHEN: Beginning on or about March 1, 1988.
HOW LONG: Ninety to one hundred days.

WHO: Eleven to fourteen skiers. Four Canadians and seven to ten Russians.

FROM WHERE TO WHERE: From Cape Arktichesky on the Severnaya Zemlya Islands to Cape Columbia on Ellesmere Island.

WHY: A scientific expedition to make geomagnetic, glacial and meteorological observations. To conduct experiments in physiology and biochemistry to determine the limits of human endurance and social isolation. According to team leader Dr. Dimitri Shparo, "We are going to join two continents with a ski track. It is a walking trip...to show that we are very close neighbors."

HOW FAR: 980 km to the Pole from Russia and 750 km from the Pole to Canada for a total distance of 1730 km.

MANAGEMENT: Privately organized by "Komsomolskaya Pravda" (Soviet Youth Newspaper) and the Polar Bridge Company, a group organized by the Canadian skiers.

EQUIPMENT: All contained in backpacks weighing from 36 to 41 kg (80 to 90 pounds) includes tents, inflatable rubber rafts, sleeping bags, heaters, cookers, food, scientific equipment, navigation and communications gear.

SUPPLIES: Delivered in six air drops, three Russian and three Canadian. Planes will land only in emergencies.

COMMUNICATIONS: Via Amateur Radio as a part of PROJECT NORDSKI COMM. Support bases in Russia, Canada and an ice island will be linked by Amateur Radio digital communications (packet radio.)

NAVIGATION: PROJECT NORDSKI COMM is a truly international project. It teams Emergency Locator Transmitters (ELT's) on the ground with SARSAT search and rescue satellites operated by the United States, Canada and several other nations. These satellites team with their Russian counterparts called COSPAS to complete the "locating" part of the project. But the information still has to get back to the trekkers.

That's where the Amateur Radio satellite called UoSAT OSCAR 11 comes in. With its "talking computer" on board, UO-11 will announce in plain English the actual location of the trekkers on an Amateur frequency easily received with small VHF radios. Thus, the skiers will be able to hear their location read to them over hand held Amateur Radio equipment as UoSAT passes over them about every 100 minutes. Celestial navigation will also be used when possible.

SUPPORT GROUPS: Southern bases at Severnaya Zemlya, at K-Pravda in Moscow and at Resolute Bay in Canada. Also from at least one ice island base and the Russian North Pole Station 28 where Russian and Canadian Amateur Radio operators will be stationed.

TRAINING: In the Tien Shan mountains of Soviet Central Asia and at Frobisher Bay, Baffin Island, Canada.

OBSTACLES: Open water, thin ice, pressure ridges, low temperatures (-50 degrees C) and storms.

Following The Transpolar SKITREK In Your Classroom

A special feature for educators
by Dick Ensign, N8IWJ
AMSAT Science Education Advisor

The organizers of the Polar SKITREK have had educators and students in mind from the beginning. The communications/navigation element of SKITREK, called NORDSKI COMM (for North Ski Communications), provides a means for you and your students to directly participate in the SKITREK and monitor the skiers' location on a daily basis. And all from the comfort of your classroom!

The very same satellite the trekkers will be using to hear their own location announced by an on board computer is easily accessible to every school in the world no matter where it may be located. With a simple setup you can tap into the experiment and monitor these transmissions. Your students can enjoy the thrill of listening in on history as it's being made because the trekkers will be listening, perhaps simultaneously, to the very same transmissions you and your students will be hearing. This "real time" participation will add realism and relevance to lessons on plotting longitudes and latitudes on maps; to calculating rate of travel; to plotting graphs and distilling findings into reports.

The key to you participation is AMATEUR RADIO. It's very likely there's at least one parent of a child attending your school who is a Ham (Amateur Radio operator). Perhaps even a teacher, administrator, cook, custodian, or student in your school has a license. Hams love to share their hobby...why not check to see who might know a Ham in the area who would like to help out while showing off his knowledge about radio and satellites.

Many Hams generally have equipment capable of operating in the Amateur 2 meter band (about 145 MHz). The most commonly encountered 2 meter radio is a small hand held radio called a handi-talkie or HT for short. These will be nearly identical to the ones the skiers are using.

Once you've located a friendly Ham in the neighborhood, tell him or her you need to hear a signal on 145.825 MHz FM and ask if he or she would like to help. If he or she is willing to help, you're on your way. He or she can easily receive the talking computer (DIGITALKER) on UoSAT OSCAR 11 with a whip antenna while standing outside with his or her HT. Alternatively, an automobile 2 meter antenna or a vertical antenna at the Ham's home will also do nicely. Placing the HT on a windowsill next a large win-

dow with an unobstructed view of the sky will also usually suffice.

Work out a way with the Ham so that you and your students can hear the Digitalker first hand on a weekly basis or more often if possible. As a further option, your Ham friend could also tape record the satellite signal for your use later. Get some good local public relations out of this at the same time by informing your local newspaper. Involved taxpayers are friendly ones!

Another option to receiving Digitalker is to use one of the many types of scanner radios. Many folks use these radios to listen to the local public service bands such as police, fire and emergency services. Many of these scanners will easily cover the 145.825 MHz frequency UO-11 is on. Check the instruction manual or a salesperson can tell you whether a particular scanner is suitable. A Ham can give you good advice on a scanner that would do the job and a suitable inexpensive or home-made antenna you can place outside your classroom window.

Because of its orbit, UO-11 is not always in view. In fact it comes and goes quickly with passages over your school ranging from only a few minutes to up to 12 or 13 minutes if it's coming right over head. Then it will disappear for another 100 minutes. After 2 or 3 of these spells it will disappear for 12 hours. Next morning it will reappear at almost the same time as it formerly did.

How will you know when to listen so you can plan ahead for the scheduled arrival of this fleet messenger? A prediction sheet for your location that covers the entire three month Skitrek period beginning March 1, 1988 is included in an information packet available to you on request. All suitable passes of UoSAT OSCAR 11 will take place between 8 AM and Noon local time.

Involve your students in making a bulletin board map of the polar area complete with latitude and longitude lines. Then plot the trek's progress with markers of your own design as you receive positions from the Digitalker. A basic map is included in the information packet which you can convert to an overhead transparency or use an opaque projector to enlarge it.

A special postcard commemorating your reception of the Digitalker will be available to you from the Canadian Amateur Radio Relay League. Information on this and how you can access weekly TRANSPOLAR SKITREK progress reports is also included in the information packet. We will also be happy to answer any questions you have about the TRANSPOLAR SKITREK.

For your information packet (to be mailed February 1, 1988) write:

Richard C. Ensign
AMSAT Science Education Advisor
421 N. Military
Dearborn, MI 48124
Phone: 1-313-278-0900 (during the school day)
1-313-274-1718 (evenings & weekends)

Cosmonauts Dock With Mir

Three Cosmonauts successfully docked with two of their colleagues on the Russian Mir Space Station Wednesday, December 23. Mission Commander of the Soyuz TM-4 launch was veteran space fairer Vladimir Titov. The Pilot/Engineer was Musa Manarov and the Research Engineer was Anatoly Levchenko. This is the first space flight for both Manarov and Levchenko. The launch on Monday, December 21 at 11:18 UTC was carried live on satellite and cable television across Europe and the U.S.

The launch and docking to Mir were routine according to Soviet news sources. Titov and Manarov will stay on board Mir for up to a year. Cosmonauts Romanencko and Alexandrov, who had been aboard Mir, were to return to earth along with Levchenko December 30. Romanencko now holds the space endurance record set on this flight of more than 10 continuous months in orbit. He has been said to be suffering physical as well as psychological stress lately.

In the past, Cosmonauts have been heard on the VHF band at 143.625 MHz making them easily observed on many receivers.

Seek Health Professionals For International Communications

A special working group in AMSAT is seeking to support a world-wide team of physicians and health professionals interested in satellites, East-West cooperation and health care concerns in the developing countries. SatelLife is a new East-West project serving health communication needs of developing countries. Its co-directors are 1985 Nobel Peace Prize winner Dr. Bernard Lown and Academician Roald Sagdeyev, Director of the Space Research Institute of the Soviet Academy of Sciences.

Volunteers are needed to spearhead the development of a global network of "informedics" to help health workers find and exchange information. Health professionals interested in such a program are asked to please send a half-page resume and interests to WA2LQQ, P.O. Box 177, Warwick, NY 10990.

AMSAT has prepared a technical proposal for SatelLife which suggests the launch of one or more PACSATs from the Mir Space Station during 1988 and 1989.

FCC Shuffles Officials Regulating Amateur Service

Raymond A. Kowalski, Chief of the Special Services Division of the Federal Communications Commission has announced he is leaving the Commission effective January 4. The Special Services Division is directly responsible for Amateur Radio. Ray's departure is a surprise to many as he had come to the Division just a couple of years ago. A lawyer, he will join a small Washington law firm. No successor has been named.

In related news, Kowalski's former boss, Ralph A. Haller, N4RH, has been promoted to Chief of the Private Radio Bureau. He was the bureau's Deputy Chief. Ralph now becomes the Commission's most senior licensed Amateur. Haller came to the Commission in 1971 from a background in broadcast engineering.

AMSAT Orbital Data Prepared by WØRPK and N5BF

Reference Orbits

UOSAT OSCAR-9 NASA #122
Period: 94.11930 minutes Longitude increment: 23.526911 degrees
Ascending Node Thu Dec 31 01:06:08.4 1987 UTC, 87.43 west

UOSAT OSCAR-11 NASA #277
Period: 98.54024 minutes Longitude increment: 24.635501 degrees
Ascending Node Thu Dec 31 00:44:49.6 1987 UTC, 43.31 west

FUJI OSCAR-12 NASA #74
Period: 115.65331 minutes Longitude increment: 29.239347 degrees
Ascending Node Thu Dec 31 00:20:13.1 1987 UTC, 323.64 west

RS-10/11 NASA #211
Period: 105.02405 minutes Longitude increment: 26.381812 degrees
Ascending Node Fri Dec 25 01:04:39.7 1987 UTC, 192.11 west

Satellite	Oscar-9
Catalog number	12888
Epoch time:	87353.21566185
Element set:	122
Inclination:	97.6362 deg
RA of node:	15.8541 deg
Eccentricity:	0.0001388
Arg of perigee:	327.0248 deg
Mean anomaly:	33.0952 deg
Mean motion:	15.30909872 rev/day
Decay rate:	3.836e-05 rev/day²
Epoch rev:	34503

Satellite	Oscar-11
Catalog number	14781
Epoch time:	87351.20812183
Element set:	277
Inclination:	98.0811 deg
RA of node:	53.2773 deg
Eccentricity:	0.0012301
Arg of perigee:	244.9328 deg
Mean anomaly:	115.0586 deg
Mean motion:	14.62202418 rev/day
Decay rate:	1.96e-06 rev/day²
Epoch rev:	20244

Satellite	Oscar-10
Catalog number	14129
Epoch time:	87350.30077537
Element set:	320
Inclination:	27.4419 deg
RA of node:	347.5599 deg
Eccentricity:	0.6030091
Arg of perigee:	264.7026 deg
Mean anomaly:	28.1419 deg
Mean motion:	2.05877063 rev/day
Decay rate:	9.5e-07 rev/day²
Epoch rev:	3391

Satellite	Oscar-12
Catalog number	16909
Epoch time:	87353.85028491
Element set:	74
Inclination:	50.0158 deg
RA of node:	174.6324 deg
Eccentricity:	0.0011054
Arg of perigee:	38.5579 deg
Mean anomaly:	321.6044 deg
Mean motion:	12.44394600 rev/day
Decay rate:	-2.5e-07 rev/day²
Epoch rev:	6150

Satellite	RS-10/11
Catalog number	18129
Epoch time:	87354.88770322
Element set:	211
Inclination:	82.9264 deg
RA of node:	280.1520 deg
Eccentricity:	0.0012773
Arg of perigee:	116.9814 deg
Mean anomaly:	243.2731 deg
Mean motion:	13.71885419 rev/day
Decay rate:	2.3e-07 rev/day²
Epoch rev:	2476

Satellite	mir
Catalog number	16609
Epoch time:	87355.87116799
Element set:	985
Inclination:	51.6286 deg
RA of node:	266.3439 deg
Eccentricity:	0.0018472
Arg of perigee:	239.3455 deg
Mean anomaly:	120.6020 deg
Mean motion:	15.74490965 rev/day
Decay rate:	6.310e-05 rev/day²
Epoch rev:	10570

Satellite	Salyut-7
Catalog number	13138
Epoch time:	87355.87633945
Element set:	907
Inclination:	51.6143 deg
RA of node:	70.2355 deg
Eccentricity:	0.0001152
Arg of perigee:	169.7242 deg
Mean anomaly:	190.3724 deg
Mean motion:	15.31777406 rev/day
Decay rate:	3.004e-05 rev/day²
Epoch rev:	32474

Satellite	ajisai
Catalog number	16908
Epoch time:	87306.47344065
Element set:	62
Inclination:	50.0146 deg
RA of node:	320.1689 deg
Eccentricity:	0.0011300
Arg of perigee:	277.2304 deg
Mean anomaly:	82.7245 deg
Mean motion:	12.44369614 rev/day
Decay rate:	-2.5e-07 rev/day²
Epoch rev:	5561

Satellite	Meteor 2-14
Catalog number	16735
Epoch time:	873352.96660928
Element set:	207
Inclination:	82.5361 deg
RA of node:	320.5770 deg
Eccentricity:	0.0015818
Arg of perigee:	101.0073 deg
Mean anomaly:	259.2870 deg
Mean motion:	13.83767676 rev/day
Decay rate:	6.0e-08 rev/day²
Epoch rev:	7891

Satellite	Meteor 2-15
Catalog number	17290
Epoch time:	87353.03647576
Element set:	129
Inclination:	82.4721 deg
RA of node:	231.7601 deg
Eccentricity:	0.0013423
Arg of perigee:	356.5951 deg
Mean anomaly:	3.5190 deg
Mean motion:	13.83574748 rev/day
Decay rate:	6.0e-08 rev/day²
Epoch rev:	4809

Satellite	Meteor 2-16
Catalog number	18312
Epoch time:	87352.32778463
Element set:	73
Inclination:	82.5554 deg
RA of node:	292.7513 deg
Eccentricity:	0.0011103
Arg of perigee:	294.0028 deg
Mean anomaly:	65.9983 deg
Mean motion:	13.83330727 rev/day
Decay rate:	2.5e-07 rev/day²
Epoch rev:	1690

Satellite	Meteor 3-1
Catalog number	16191
Epoch time:	87352.17963941
Element set:	724
Inclination:	82.5491 deg
RA of node:	262.5180 deg
Eccentricity:	0.0017879
Arg of perigee:	222.4567 deg
Mean anomaly:	137.5272 deg
Mean motion:	13.16923344 rev/day
Decay rate:	4.3e-07 rev/day²
Epoch rev:	10352

AMSAT® NA

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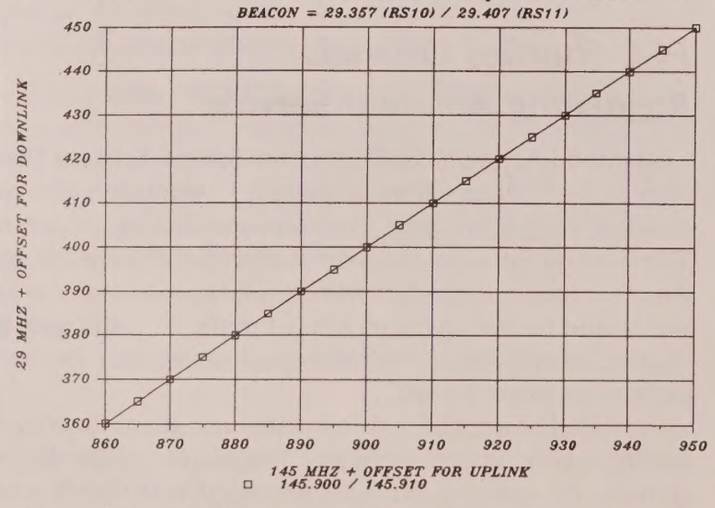
RS 10 /11 MODE A FREQ CONVERSION



This graph together with the ones published in ASR #164 and #165 were developed and provided by Robert L. Goodman, KD5SB, using Lotus 1-2-3.

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